

- on page 55, line 14, delete "figure 6-1" and substitute therefore "figure 13"
- on page 55, line 16, delete "(figure 6-1)" and substitute therefore "(figure 13)"

NE

REMARKS

1) In reply to the objection under U.S.C. §112, first paragraph, Applicants submit herewith (Attachment D) a Declaration perfecting the deposit of the claimed yeast strains executed by Mr. Rossi, who is an authorized representative of Assignee, LESAFFRE ET CIE, as well as the receipts of the original deposits (Attachments E1 to E9) and the corresponding translations into English (Attachments F1 to F9).

2) In response to the objections under U.S.C. §112, second paragraph, amended claims 1-7, 9, 10, 12, 14-23, 36, 38, 40 and 41 and newly presented claims 42 to 59, were drafted in order to remedy any deficiencies under said paragraph.

A large number of amendments have been introduced.

In particular, applicants have deleted the term "new" from the claims and have, where required, put the claim in the singular form.

The claims have been restricted to processes for obtaining fil yeast strains, fil yeast strains and yeasts obtained by culturing said fil yeast strains.

With respect to the meaning of the expressions "classic mutagenic treatment" or "mutagenic treatment" as used in the claims, applicants beg to point out that, during examination, if in the specification a specific meaning is attributed to an expression, this meaning must be used to interpret the claim.

In the present specification, a clear distinction is drawn between, on the one hand, "mutagenic treatment", "mutation (= mutagenesis)", "classical genetics", "classic genetics", "classic mutagenic treatment", "mutagenesis treatment" and on the other hand, "transformation by recombinant DNA", "recombinant DNA technologies", "recombinant DNA or genetic engineering techniques".

Likewise, in the present specification, a clear distinction is drawn between, on the one hand "mutated yeast strains", "mutated and selected fil strains", "mutant strains" and, on the other hand, "strains genetically transformed", "transformed strains".

Applicants refer in this respect for example to page 1, lines 28 to 30, page 5, lines 22 to 25, page 7, line 30 to page 8, line 3, page 14, line 31, to page 15, line 3.

The term "mutagenic treatment" as used in the specification of the present application is clearly the opposite of "recombinant DNA techniques".

NON-
COMPLIANT

This is furthermore confirmed by the repeated statement in the specification that the invention provides fil strains which are not genetically modified microorganisms in the meaning of the European directive CEE 90/220 (see, for example, page 11, lines 16 to 22) and is further illustrated by the specific methods of mutagenic treatment mentioned on page 24, lines 24 to 29 : "mutagenic treatment using a chemical agent such as EMS" and "by ultraviolet light".

It is therefore manifest that the term "mutagenic treatment" as used in the specification and in the claims is restricted to such treatment which does not involve recombinant DNA techniques.

Where the claims contained a broad range followed by one or more preferred or illustrative narrow ranges, only one range was retained per claim. Preferred narrower ranges are claimed separately. For example, new claims 45, 46 and 47, depending on amended claim 1, relate to the respective preferred levels of stress resistance of the selected yeast strains as mentioned in original claim 1.

Amended claim 2 now explicitly mentions the useful secondary property of alcohol assimilation and the hampering property of the production metabolites which give a bad smell or a bad or abnormal taste to breads, as described on page 2, lines 13 to 15, on page 24, lines 4 to 6 and lines 19 to 21, and on page 26, lines 17 to 22.

The blanks in claims 19 to 23 have been filled in.

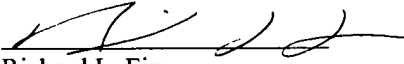
Also attached are viability declarations of the various strains involved.

CONCLUSION

In view of the newly presented claims and the attachments, it is believed that the applications in condition for allowance and notice to that effect is respectfully requested.

Respectfully submitted,
THEVELEIN et al.

Date: 12-19-01


Richard L. Fix
Reg. No. 28,297

HENDERSON & STURM LLP
206 Sixth Avenue, Suite 1213
Des Moines, Iowa 50309-4076
Telephone: 515-288-9589
Telefax: 515-288-4860

ATTACHMENT A

(6 pages)

The invention claimed is:

1. (amended) A process for obtaining yeast strains conserving stress resistance in the presence of fermentable sugars, comprising the following steps :

a mutagenic treatment is carried out on the cells of a starting strain,

the cells having undergone the said mutagenic treatment are cultured so as to obtain a stationary phase,

the said cells in stationary phase are incubated in the presence of at least one fermentable sugar selected from the group comprising glucose, maltose, and sucrose, this sugar being present in a quantity such that the cells enter an active metabolic state (fermentation and/or growth),

said cells in active metabolic state are subjected to one or several stresses leading to a mortality rate of at least 99% with respect to the starting population,

the surviving cells are isolated and

those of the surviving cells which respond to the following criteria which characterize the fil phenotype are selected :

- a growth, evaluated by production or production yield of biomass over sugar in a given time or by a growth rate, under identical culture conditions, at least equal to 80% of the starting strain,
- a CO₂ release, or a metabolite production, in identical conditions, at least equal to 80% of the starting strain,
- a stress resistance, corresponding to a survival rate at least 2 times higher than the survival rate of the starting strain, under identical phase conditions corresponding to a growth or active metabolism followed by a heat shock of at least 20 minutes at 52°C, or at least 1.5 times higher than the survival rate of the starting strain, under identical conditions of growth phase followed by freezing for a period of at least 24 hours at -20°C or at a lower temperature,
- maintenance of these properties after repeated cultures on non selective medium, so as to verify that the fil phenotype obtained by the mutation is perfectly stable and permanent.

2. (amended) A process according to claim 1, wherein it is checked that the selected yeast strains present an alcohol assimilation, under identical conditions, at least

equal to 50% of that of the starting strain and that the selected yeast strains do not produce metabolites which give a bad smell or a bad or abnormal taste to breads.

3. (amended) A process according to claim 1, wherein the starting strain is an industrial strain.

4. (amended) A process according to claim 3, wherein an industrial fil mutant carrying several mutations is obtained and wherein :

- the segregants issued from this industrial mutant are crossed with a laboratory haploid strain to select the segregant issued from this industrial mutant giving to the polyploids obtained with the laboratory strain an improvement in the required properties;
- the segregants thus selected are crossed one with the other;
- the polyploids obtained are selected according to the criteria of fil phenotypes defined in claim 1.

5. (amended) A process according to claim 1, wherein the selected fil strains have the property of conserving, in growth and/or fermentation phase on fermentable sugars, at least 50% of their survival rate with respect to the survival rate in stationary phase measured under the same conditions after a heat or freeze shock.

6. (amended) A process according to claim 1, wherein the cells obtained after mutagenic treatment are introduced into pieces of dough subjected to at least 100 cycles of freezing/thawing after a first fermentation of the dough of 30 minutes at 30°C.

7. (amended) An industrial yeast strain having the fil phenotype.

8. (deleted)

9. (amended) A strain according to claim 7, belonging to *Saccharomyces cerevisiae* species.

10. (amended) A yeast strain according to claim 7 having a survival rate, in growth phase on fermentable sugars, of at least 50% after a heat treatment of 20 minutes at 52°C, the growth phase being defined as a reculturing on glucose of 10 minutes at 30°C after stationary phase.

11. (deleted)

12. (amended) An industrial yeast according to claim 7 whose stability to freezing in lumps of dough incubated 60 minutes at 30°C before freezing and containing 20 g of flour, 15 g of water, 1 g of sucrose, 0.405 g of NaCl, 0.06 g of (NH₄)₂SO₄ and 160 mg of dry matter of the considered strain, defined by the ratio between the release

A1
CON4

A2

A3

of CO₂ at 30°C after 1 month or 30 days of conservation at -20°C and the release of CO₂ at 30°C after 1 day of conservation at -20°C, is at least equal to 80%.

13. (deleted)

14. (amended) A yeast strain according to claim 57, whose loss of released gas after drying of the biomass harvested in a phase close to exponential growth phase is at most equal to 67% of the loss of released gas after drying of yeasts obtained using the corresponding starting strain.

15. (amended) Strain PVD1150 = M5 *fil1* deposited at C.N.C.M. under the n° I-2031 and the n° I-2203.

16. (amended) Strain KL1 = W303 *fil2* deposited at C.N.C.M. under the n° I-2032.

17. (amended) Strain FD51 = HL816 *fil300* deposited at C.N.C.M. under the n° I-2033.

18. (amended) Strain FDH16-22 = HL822 *fil300* deposited at C.N.C.M. under the n° I-2034.

19. (amended) Strain AT25 = S47 *fil400* deposited at C.N.C.M. under the n° I-2035.

20. (amended) Strain AT28 = S47 *fil500* deposited at C.N.C.M. under the n° I-2036.

21. (amended) Strain AT251 deposited at C.N.C.M. under the n° I-2222.

22. (amended) Strain AT252 deposited at C.N.C.M. under the n° I-2223.

23. (amended) Strain AT254 deposited at C.N.C.M. under the n° I-2224.

24. (deleted)

25. (deleted)

36. (amended) A baker's yeast intended for frozen doughs obtained by culturing a strain according to claim 7.

37. (deleted)

38. (amended) A dry baker's yeast obtained by culturing a strain according to claim 7.

39. (deleted)

40. (amended) A brewery yeast obtained by culturing a strain according to claim 7.

A7
CONT.

41. (amended) A yeast intended for the production of alcohol obtained by culturing a strain according to claim 7.

42. (new) A process according to claim 1, wherein the yeast strains are of the *Saccharomyces cerevisiae* species.

43. (new) A process according to claim 1, wherein the selected yeast strains present a growth, evaluated by production or production yield of biomass over sugar in a given time or by a growth rate, under identical culture conditions, at least equal to 90% of the starting strain.

44. (new) A process according to claim 1, wherein the selected yeast strains present a CO₂ release, or a metabolite production, in identical conditions, at least equal to 90% of the starting strain.

45. (new) A process according to claim 1, wherein the selected yeast strains present a stress resistance, corresponding to a survival rate at least 3 times higher than the survival rate of the starting strain, under identical phase conditions corresponding to a growth or active metabolism followed by a heat shock of at least 20 minutes at 52°C, or at least 2 times higher than the survival rate of the starting strain, under identical conditions of growth phase followed by freezing for a period of at least 24 hours at -20°C or at a lower temperature.

46. (new) A process according to claim 1, wherein the selected yeast strains present a stress resistance, corresponding to a survival rate at least 5 times higher than the survival rate of the starting strain, under identical phase conditions corresponding to a growth or active metabolism followed by a heat shock of at least 20 minutes at 52°C, or at least 3 times higher than the survival rate of the starting strain, under identical conditions of growth phase followed by freezing for a period of at least 24 hours at -20°C or at a lower temperature.

47. (new) A process according to claim 1, wherein the selected yeast strains present a stress resistance, corresponding to a survival rate at least 10 times higher than the survival rate of the starting strain, under identical phase conditions corresponding to a growth or active metabolism followed by a heat shock of at least 20 minutes at 52°C, or at least 5 times higher than the survival rate of the starting strain, under identical conditions of growth phase followed by freezing for a period of at least 24 hours at -20°C or at a lower temperature.

A8

48. (new) A process according to claim 1, wherein the selected fil strains have the property of conserving, in growth and/or fermentation phase on fermentable sugars, at least 60% of their survival rate with respect to the survival rate in stationary phase measured under the same conditions after a heat or freeze shock.

49. (new) A process according to claim 1, wherein the selected fil strains have the property of conserving, in growth and/or fermentation phase on fermentable sugars, at least 70% of their survival rate with respect to the survival rate in stationary phase measured under the same conditions after a heat or freeze shock.

50. (new) A process according to claim 1, wherein the selected fil strains have the property of conserving, in growth and/or fermentation phase on fermentable sugars, at least 80% of their survival rate with respect to the survival rate in stationary phase measured under the same conditions after a heat or freeze shock.

51. (new) An industrial yeast strain according to claim 7 belonging to the *Saccharomyces* genus.

52. (new) A yeast strain according to claim 7 having a survival rate, in growth phase on fermentable sugars, of at least 60% after a heat treatment of 20 minutes at 52°C, the growth phase being defined as a reculturing on fermentable sugar of 10 minutes at 30°C after stationary phase.

53. (new) A yeast strain according to claim 7 having a survival rate, in growth phase on fermentable sugars, of at least 70% after a heat treatment of 20 minutes at 52°C, the growth phase being defined as a reculturing on fermentable sugar of 10 minutes at 30°C after stationary phase.

54. (new) A yeast strain according to claim 7 having a survival rate, in growth phase on fermentable sugars, of at least 75% after a heat treatment of 20 minutes at 52°C, the growth phase being defined as a reculturing on fermentable sugar of 10 minutes at 30°C after stationary phase.

55. (new) An industrial yeast according to claim 7 whose stability to freezing in lumps of dough incubated 60 minutes at 30°C before freezing and containing 20 g of flour, 15 g of water, 1 g of sucrose, 0.405 g of NaCl, 0.06 g of $(\text{NH}_4)_2\text{SO}_4$ and 160 mg of dry matter of the considered strain, defined by the ratio between the release of CO_2 at 30°C after 1 month or 30 days of conservation at -20°C and the release of CO_2 at 30°C after 1 day of conservation at -20°C, is at least equal to 85%.

A8
CONT.

56. (new) An industrial yeast according to claim 7 whose stability to freezing in lumps of dough incubated 60 minutes at 30°C before freezing and containing 20 g of flour, 15 g of water, 1 g of sucrose, 0.405 g of NaCl, 0.06 g of $(\text{NH}_4)_2\text{SO}_4$ and 160 mg of dry matter of the considered strain, defined by the ratio between the release of CO_2 at 30°C after 1 month or 30 days of conservation at -20°C and the release of CO_2 at 30°C after 1 day of conservation at -20°C, is at least equal to 90%.

57. (new) An industrial yeast strain having the fil phenotype, obtainable by the process according to claim 1, presenting an alcohol assimilation, under identical conditions, at least equal to 50% of that of the starting strain and not producing metabolites which give a bad smell or a bad or abnormal taste to breads.

58. (new) A yeast strain according to claim 57, whose loss of released gas after drying of the biomass harvested in a phase close to exponential growth phase is at most equal to 50% of the loss of released gas after drying of yeasts obtained using the corresponding starting strain.

59. (new) A baker's yeast obtained by culturing a yeast strain according to claim 7.

A8
cont.

ATTACHMENT B

(7 pages)

The invention claimed is:

1. (amended) [Process] A process for obtaining [new eukaryotic strains, preferably new] yeast strains[, and even more preferentially strains of *Saccharomyces cerevisiae*] conserving stress resistance in the presence of fermentable sugars[such as glucose], comprising the following steps :
 - a [classic] mutagenic treatment is carried out on the cells of a starting strain,
 - the cells having undergone the said mutagenic treatment are cultured so as to obtain a stationary phase,
 - the said cells in stationary phase are incubated in the presence of at least one fermentable sugar selected from the group comprising glucose, maltose, and sucrose, this sugar being present in a quantity such that the cells enter an active metabolic state (fermentation and/or growth)[of this sugar],
 - said cells in active metabolic state are subjected to one or several stresses leading to a mortality rate of at least 99% with respect to the starting population,
 - the surviving cells are isolated and
 - those of the surviving cells which respond to the following criteria which characterize the fil phenotype are selected[, i.e.] :
 - a growth, evaluated by production or production yield of biomass over sugar in a given time or by a growth rate, under identical culture conditions, at least equal to 80% of the starting strain[, and preferably at least equal to 90% of the starting strain],
 - a CO₂ release, or a metabolite production, in identical conditions, at least equal to 80%[, and preferably at least equal to 90%] of the starting strain,
 - a stress resistance, corresponding to a survival rate at least 2 times higher[, preferably at least 3 times higher, more preferentially at least 5 times higher, and even more preferentially at least 10 times higher] than the survival rate of the starting strain, under identical phase conditions corresponding to a growth or active metabolism followed by a heat shock of at least 20 minutes at 52°C, or at least 1.5 times higher[, preferably at least 2 times higher, more preferably at least 3 times higher, and even more preferentially at least 5 times higher] than the survival rate of the starting strain, under identical conditions of growth phase followed by freezing for a period of at least 24 hours at -20°C or at a lower temperature,

- maintenance of these properties after repeated cultures on non selective medium[, such as YPD medium], so as to verify that the fil phenotype obtained by the mutation is perfectly stable and permanent.

2. (amended) [Process] A process according to claim 1, wherein it is checked that [any useful secondary property has not been lost] the selected yeast strains present an alcohol assimilation, under identical conditions, at least equal to 50% of that of the starting strain and that [any hampering property has not appeared] the selected yeast strains do not produce metabolites which give a bad smell or a bad or abnormal taste to breads.

3. (amended) [Process] A process according to claim 1, wherein the starting strain is an industrial strain.

4. (amended) [Process] A process according to claim 3, wherein an industrial fil mutant carrying several mutations is obtained and wherein :

- the segregants issued from this industrial mutant are crossed with a laboratory haploid strain to select the segregant issued from this industrial mutant giving to the polyploids obtained with the laboratory strain an improvement in the required properties;
- the segregants thus selected are crossed one with the other;
- the polyploids obtained are selected according to the criteria of fil phenotypes defined in claim 1.

5. (amended) [Process] A process according to claim 1, wherein the selected fil strains [preferably]have the property of conserving, in growth and/or fermentation phase on fermentable sugars, at least 50%[, preferably at least 60%, more preferentially at least 70%, and even more preferentially at least 80%] of their survival rate with respect to the survival rate in stationary phase measured under the same conditions after a heat or freeze shock.

6. (amended) [Process] A process according to claim 1, wherein the cells obtained after [mutagenesis]mutagenic treatment are introduced into pieces of dough subjected to at least 100 cycles of freezing/thawing after a first fermentation of the dough of 30 minutes at 30°C.

7. (amended) [New] An industrial [eukaryotic]yeast strain[, preferably of yeast and still more][preferably belonging to the *Saccharomyces* genus,] having the fil phenotype[, obtainable by the process according to claim 1].

8. (deleted) [New industrial yeast strain, preferably belonging to the *Saccharomyces* genus and still more preferably belonging to the *Saccharomyces cerevisiae* species, having the fil phenotype, obtainable by the process according to claim 2].
9. (amended) [New] A strain according to claim 7, belonging to *Saccharomyces cerevisiae* species.
10. (amended) [New] A yeast strain according to claim 7 having a survival rate, in growth phase on fermentable sugars, of at least 50%[, preferably at least 60%, more preferably at least 70% and still more preferably at least 75%,] after a heat treatment of 20 minutes at 52°C, [,]the growth phase being defined as a reculturing on [fermentable sugar (]glucose[)] of 10 minutes at 30°C after stationary phase.
11. (deleted) [New yeast strain according to claim 8 having a survival rate, in growth phase on fermentable sugars, of at least 50%, preferably at least 60%, more preferably at least 70% and still more preferably at least 75%, after a heat treatment of 20 minutes at 52°C, , the growth phase being defined as a reculturing on fermentable sugar (glucose) of 10 minutes at 30°C after stationary phase]
12. (amended) [New] An industrial yeast according to claim 7 whose stability to freezing in lumps of dough incubated 60 minutes at 30°C before freezing and containing 20 g of flour, 15 g of water, 1 g of sucrose, 0.405 g of NaCl, 0.06 g of (NH₄)₂SO₄ and 160 mg of dry matter of the considered strain, defined by the ratio between the release of CO₂ at 30°C after 1 month or 30 days of conservation at -20°C and the release of CO₂ at 30°C after 1 day of conservation at -20°C, is at least equal to 80%[, preferably at least equal to 85% and more preferably at least equal to 90%].
13. (deleted) [New industrial yeast strain according to claim 8, whose stability to freezing in lumps of dough incubated 30 minutes at 30°C before freezing and containing 20 g of flour, 15 g of water, 0.405 g of NaCl, 0.06 g of (NH₄)₂SO₄ and 160 mg of dry matter of the considered strain, measured by the ratio between the release of CO₂ at 30°C after 1 month or 30 days of conservation at -20°C and the release of CO₂ at 30°C after 1 day of conservation at -20°C, is at least higher than 80%, preferably at least higher than 85% and more preferably at least higher than 90%].
14. (amended) [New] A yeast strain according to claim [7] 57, whose loss of released gas after drying of the biomass harvested in a phase close to exponential growth phase is at most equal to 67%[, preferably at most equal to 50%] of the loss of

released gas after drying of yeasts obtained using the corresponding starting strain[or a control strain having the same characteristics].

15. (amended) [New strain] Strain PVD1150 = M5 *fil1* deposited at C.N.C.M. under the n° I-2031 and the n° I-2203.
16. (amended) [New strain] Strain KL1 = W303 *fil2* deposited at C.N.C.M. under the n° I-2032.
17. (amended) [New strain] Strain FD51 = HL816 *fil300* deposited at C.N.C.M. under the n° I-2033.
18. (amended) [New strain] Strain FDH16-22 = HL822 *fil300* deposited at C.N.C.M. under the n° I-2034.
19. (amended) [New strain] Strain AT25 = S47 *fil400* deposited at C.N.C.M. under the n° I-2035.
20. (amended) [New strain] Strain AT28 = S47 *fil500* deposited at C.N.C.M. under the n° I-2036.
21. (amended) [New strain] Strain AT251 deposited at C.N.C.M. under the n° I-2222.
22. (amended) [New strain] Strain AT252 deposited at C.N.C.M. under the n° I-2223.
23. (amended) [New strain] Strain AT254 deposited at C.N.C.M. under the n° I-2224.
24. (deleted) [New strains belonging to the same kind than strains AT25 and AT28.]
25. (deleted) [[New strains belonging to the same kind than strains AT251, AT252 and AT24.]
36. (amended) [Process for obtaining] A baker's yeast intended for frozen doughs [comprising the use of] obtained by culturing a strain according to claim 7.
37. (deleted) [Process for obtaining baker's yeast intended for frozen doughs a strain according to claim 8].
38. (amended) [Process for obtaining] A dry baker's yeast [comprising the use of] obtained by culturing a strain according to claim 7.
39. (deleted) [Process for obtaining brewery yeast comprising the use of a strain according to claim 8].

40. (amended) [Process for obtaining] A brewery yeast [comprising the use of] obtained by culturing a strain according to claim 7.

41. (amended) [Process for obtaining yeasts] A yeast intended for the production of alcohol [comprising the use of] obtained by culturing a strain according to claim 7.

42. (new) A process according to claim 1, wherein the yeast strains are of the *Saccharomyces cerevisiae* species.

43. (new) A process according to claim 1, wherein the selected yeast strains present a growth, evaluated by production or production yield of biomass over sugar in a given time or by a growth rate, under identical culture conditions, at least equal to 90% of the starting strain.

44. (new) A process according to claim 1, wherein the selected yeast strains present a CO₂ release, or a metabolite production, in identical conditions, at least equal to 90% of the starting strain.

45. (new) A process according to claim 1, wherein the selected yeast strains present a stress resistance, corresponding to a survival rate at least 3 times higher than the survival rate of the starting strain, under identical phase conditions corresponding to a growth or active metabolism followed by a heat shock of at least 20 minutes at 52°C, or at least 2 times higher than the survival rate of the starting strain, under identical conditions of growth phase followed by freezing for a period of at least 24 hours at -20°C or at a lower temperature.

46. (new) A process according to claim 1, wherein the selected yeast strains present a stress resistance, corresponding to a survival rate at least 5 times higher than the survival rate of the starting strain, under identical phase conditions corresponding to a growth or active metabolism followed by a heat shock of at least 20 minutes at 52°C, or at least 3 times higher than the survival rate of the starting strain, under identical conditions of growth phase followed by freezing for a period of at least 24 hours at -20°C or at a lower temperature.

47. (new) A process according to claim 1, wherein the selected yeast strains present a stress resistance, corresponding to a survival rate at least 10 times higher than the survival rate of the starting strain, under identical phase conditions corresponding to a growth or active metabolism followed by a heat shock of at least 20 minutes at 52°C, or at least 5 times higher than the survival rate of the starting strain, under identical

conditions of growth phase followed by freezing for a period of at least 24 hours at -20°C or at a lower temperature.

48. (new) A process according to claim 1, wherein the selected fil strains have the property of conserving, in growth and/or fermentation phase on fermentable sugars, at least 60% of their survival rate with respect to the survival rate in stationary phase measured under the same conditions after a heat or freeze shock.

49. (new) A process according to claim 1, wherein the selected fil strains have the property of conserving, in growth and/or fermentation phase on fermentable sugars, at least 70% of their survival rate with respect to the survival rate in stationary phase measured under the same conditions after a heat or freeze shock.

50. (new) A process according to claim 1, wherein the selected fil strains have the property of conserving, in growth and/or fermentation phase on fermentable sugars, at least 80% of their survival rate with respect to the survival rate in stationary phase measured under the same conditions after a heat or freeze shock.

51. (new) An industrial yeast strain according to claim 7 belonging to the Saccharomyces genus.

52 (new) A yeast strain according to claim 7 having a survival rate, in growth phase on fermentable sugars, of at least 60% after a heat treatment of 20 minutes at 52°C, the growth phase being defined as a reculturing on fermentable sugar of 10 minutes at 30°C after stationary phase.

53. (new) A yeast strain according to claim 7 having a survival rate, in growth phase on fermentable sugars, of at least 70% after a heat treatment of 20 minutes at 52°C, the growth phase being defined as a reculturing on fermentable sugar of 10 minutes at 30°C after stationary phase.

54. (new) A yeast strain according to claim 7 having a survival rate, in growth phase on fermentable sugars, of at least 75% after a heat treatment of 20 minutes at 52°C, the growth phase being defined as a reculturing on fermentable sugar of 10 minutes at 30°C after stationary phase.

55. (new) An industrial yeast according to claim 7 whose stability to freezing in lumps of dough incubated 60 minutes at 30°C before freezing and containing 20 g of flour, 15 g of water, 1 g of sucrose, 0.405 g of NaCl, 0.06 g of (NH₄)₂SO₄ and 160 mg of dry matter of the considered strain, defined by the ratio between the release of CO₂ at

30°C after 1 month or 30 days of conservation at -20°C and the release of CO₂ at 30°C after 1 day of conservation at -20°C, is at least equal to 85%.

56. (new) An industrial yeast according to claim 7 whose stability to freezing in lumps of dough incubated 60 minutes at 30°C before freezing and containing 20 g of flour, 15 g of water, 1 g of sucrose, 0.405 g of NaCl, 0.06 g of (NH₄)₂SO₄ and 160 mg of dry matter of the considered strain, defined by the ratio between the release of CO₂ at 30°C after 1 month or 30 days of conservation at -20°C and the release of CO₂ at 30°C after 1 day of conservation at -20°C, is at least equal to 90%.

57. (new) An industrial yeast strain having the fil phenotype, obtainable by the process according to claim 1, presenting an alcohol assimilation, under identical conditions, at least equal to 50% of that of the starting strain and not producing metabolites which give a bad smell or a bad or abnormal taste to breads.

58. (new) A yeast strain according to claim 57, whose loss of released gas after drying of the biomass harvested in a phase close to exponential growth phase is at most equal to 50% of the loss of released gas after drying of yeasts obtained using the corresponding starting strain.

59. (new) A baker's yeast obtained by culturing a yeast strain according to claim 7.